An Ordinary Fermilab Physics Career

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October 1, 2008

In attempting to address the issue of why America should support science, I will describe what has happened at the Fermi National Accelerator Laboratory as it pertains to things for which I have had the opportunity to participate directly. As I write this, I am approaching the end of 35 years as an employee. I am a physicist, a good physicist, I assert, or I would not be on the staff, but an ordinary physicist among my colleagues. Let me tell you what has been accomplished 'on my watch.'

The science we have addressed is the reason the laboratory was built. I joined in the first year after my PhD was awarded. The collaboration building a new apparatus but operating one that had just been completed so I was assigned to be sure the key detectors were constructed. The apparatus was assembled, operated, upgraded. The results were studied. In 1977 we announced the discovery of the 5^{th} quark. The discovery and study of the 6^{th} quark at Fermilab required new accelerators so I joined that effort.

In order to remain in particle physics, I stayed at Fermilab, working on operation of accelerators, building and testing magnets for new accelerators, commissioning and operating the new accelerators, and joining new collaborations for examining new physics questions. Along the way, I was able to be part of the team which created two unique new types of machines. The Tevatron was the first superconducting accelerator and storage ring. The Recycler was the first ring built using permanent magnets. While each technology was chosen because of unique capabilities, I note that both achieved reduced operation costs by requiring much less energy – and the technology works for other applications.

Not only has Fermilab done exciting physics and built facilities using exciting new technology, but it has applied its core knowledge to other tasks. Cancer treatment using proton beams is coming into its own. Two new facilities were just approved for construction in Illinois. But the pioneering facility at Loma Linda University is a machine constructed in the building where I worked. Its magnets were measured and refined using the magnet measurement system build by me and my colleagues.

This is not the only medical application of technology for which critical developments were guided by my colleagues. The world of MRI would be completely different without superconducting magnets. An industrial base for making superconducting wire was established for building the Tevatron. Even the Niobium-Titanium alloy order for the first Tevatron cable was as large as the annual consumption for the nation at the time it was placed.

Without minimizing the significance or satisfaction of other projects in my career, let me close this by relating a favorite story. The magnet measurement systems which occupied my efforts were rebuilt as need arose. For one effort, we needed to consider a new computer software solution. The expert was visiting from CERN and he agreed to meet with us. A couple of years later, when a Computing Techniques Seminar was scheduled, I would not have missed it. Tim Berners-Lee was making the presentation. But his title meant nothing to most of us: World-Wide Web - The Universe of Information. There is no doubt, the esoteric world of particle physics inspired the information sharing concept which has transformed our world.

It greatly saddens me to realize that my colleagues and I have failed to inspire our country and our country's leaders with a passion for allowing, nay insisting that this sort of creative ferment be continued. I do hope that this review will inspire at least a question or two about the cost of cutting back on our future.